

AMENDMENTS TO THE CLAIMS

1-26. (Cancel)

27. (Currently amended) A method for achieving a desired dose distribution comprising:
obtaining at least one treatment planning image from a patient to determine the relative location of target and sensitive structures;
preparing a treatment plan for the patient based on the at least one treatment planning image, the treatment plan including a planned dose distribution;
obtaining at least one three-dimensional image from the patient in substantially a treatment position, the three-dimensional image including anatomical data and being used for volumetric dose calculations;
comparing the at least one treatment planning image and the at least one three-dimensional image; and
adjusting how the dose is received by the patient based on the comparison.

28. (Previously presented) The method of claim 27 wherein the planned dose distribution for the patient is based on the treatment plan.

29. (Previously presented) The method of claim 27 further comprising repositioning the planned dose distribution for the patient based on the at least one three-dimensional image of the patient in substantially a treatment position.

30. (Previously presented) The method of claim 27 further comprising modifying the treatment plan and the planned dose distribution.

31. (Previously presented) The method of claim 27 further comprising adjusting patient position to better position patient's internal anatomy relative to the planned dose distribution.

32. (Previously presented) The method of claim 28, wherein the planned dose distribution is based on the at least one three-dimensional image of the patient in substantially a treatment position.

33. (Previously presented) The method of claim 27, wherein the planned dose distribution is modified to take into account changes in patient position and/or changes in patient anatomy.

34. (Previously presented) The method of claim 27, further comprising selecting a treatment plan from a plurality of preexisting plans for the patient based on the three-dimensional image acquired from the patient at the time of treatment delivery.
35. (Previously presented) The method of claim 34, wherein multiple plans created with objective functions are used for treatment delivery.
36. (Previously presented) The method of claim 27, wherein objective functions and weightings are adjusted to fine-tune treatment delivery.
37. (Previously presented) The method of claim 27, wherein objective function weights are learned.
38. (Previously presented) The method of claim 27, wherein the output of the dose calculation is utilized to move the patient, modify treatment delivery, or some combination of the two.
39. (Previously presented) The method of claim 27, further comprising generating contours on one of the target and sensitive structures by one of manual contouring, automated contouring, deformable fusion, template-based automatic contouring, and a combination thereof.
40. (Previously presented) The method of claim 27, wherein adjusting how the dose is received by the patient includes repositioning the patient to improve the dose distribution.
41. (Previously presented) The method of claim 27, wherein the images of the patient are obtained using one of non-quantitative CT, MRI, PET, SPECT, ultrasound, transmission imaging, fluoroscopy, and RF-based localization.
42. (Previously presented) The method of claim 38, wherein the treatment plan includes initially available images and related treatment plans and images obtained subsequent to initial planning.

43. (Previously presented) The method of claim 27, wherein adjusting how the dose is received by the patient includes utilizing one of image information, contour information, dose-volume histograms, and dosimetric information to reposition the patient.
44. (Currently amended) A method of delivering radiation therapy, the method comprising:
acquiring a first image of a region of interest in a patient;
generating a plurality of radiation treatment plans for the patient based on the first image;
acquiring a second image of the region of interest while the patient is in substantially a treatment position, the second image being at least three-dimensional and including anatomical data; and
selecting one of the radiation treatment plans based at least in part on dosimetric information from the second image.
45. (Previously presented) The method of claim 44 further comprising generating a different radiation treatment plan based on a different position of the region of interest than the position of the region of interest in the first image and the second image.
46. (Previously presented) The method of claim 44 further comprising comparing a position of the region of interest in the first image to a position of the region of interest in the second image.
47. (Previously presented) The method of claim 44 wherein each of the radiation treatment plans includes a contour defining a margin around the region of interest based on the position of the region of interest in the first image.
48. (Previously presented) The method of claim 44 wherein the second image is adequate for dose calculations.
50. (Previously presented) A method of delivering radiation therapy, the method comprising:
acquiring a first image of a patient;
generating a radiation treatment plan for the patient, the radiation treatment plan based on the first image;

acquiring a second image of the patient substantially in a treatment position, the second image being three-dimensional and suitable for three-dimensional contouring;
generating a contour on the second image; and
identifying a patient position with respect to a radiation delivery device based on dosimetric information and the contour.

51. (Previously presented) The method of claim 50 wherein the second image is suitable for dose calculations.

52. (Previously presented) The method of claim 51 wherein identifying a patient position is further based on the dose calculations.

53. (Previously presented) The method of claim 50 further comprising generating a plurality of treatment plans based at least in part on the first image.

54. (Previously presented) The method of claim 53 further comprising selecting one of the treatment plans for delivery to the patient, the selected treatment plan based on a desired patient position.

55. (Previously presented) The method of claim 50 wherein the dosimetric information is determined from the first image.

56. (Previously presented) The method of claim 50 wherein the dosimetric information is determined from the second image.

57. (Previously presented) The method of claim 50 wherein the dosimetric information is determined from a combination of the first image and the second image.